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Pringsheims Jahrbücher für wissenschaftlicher Botanik. After the death of Pringsheim, this was issued for several years under the joint editorship of Pfeffer and his distinguished colleague, Strasburger.

Shortly before the outbreak of the war Pfeffer's old students were invited to contribute to a "Festschrift" to celebrate the fiftieth anniversary of his doctorate and his seventieth birthday. The volume appeared in 1915, but the circumstances of the war resulted in the absence of many names which under normal conditions would certainly have appeared in it.

Pfeffer survived the horrors of the Great War, in which he lost his only son, and saw the collapse of the great German empire, in whose upbuilding he and his scientific colleagues played such an important rôle. He had the satisfaction, however, of knowing that their work would survive the downfall of the imperial government and that his name will always rank high in the annals of science.

DOUGLAS HOUGHTON CAMPBELL.

EDWARD CHARLES PICKERING (1846–1919).

Fellow in Class I, Section 1, 1867.

In the death of Edward Charles Pickering after a service of forty-two years as Director of the Harvard College Observatory, the American Academy loses an interested and important Fellow and the Science of Astronomy one who was at his death the dean of astronomical research in America.

He was born in Boston, Massachusetts, July 19, 1846, of a distinguished and highly cultivated New England family. In 1865, he graduated from the Lawrence Scientific School with the degree of S.B. He was immediately thereupon appointed instructor in mathematics in that institution, but the following year he became assistant instructor in Physics in the Massachusetts Institute of Technology, and two years after was made Thayer Professor of Physics.

From the very outset of his teaching his peculiar bent of mind was revealed and the work of research and organization which constituted his great contribution to modern science was begun.

He planned and put into practical shape for use in systematic class instruction the experimental laboratory method in the teaching of

Physics which did much to make the Institute of Technology famous and has since been accepted and adopted universally as an indispensable method of instruction in that subject. To the laboratory which he had organized and built up the Corporation of the Institute in 1872 at his suggestion gave the name Rogers Laboratory of Physics and the additional title of Director of the Laboratory was conferred upon him.

In the autumn of 1876 he was called to become the Director of the Harvard College Observatory, and accepting this invitation he entered upon the duties of the position in February, 1877. His selection by President Eliot seemed at the time a radical innovation for Professor Pickering was a physicist rather than an astronomer of the old school. However, the appointment was justified for it presaged the trend of the New Astronomy along the lines of Physics, a development in which Professor Pickering has borne a most honorable part.

As Director of the Observatory he showed great administrative ability and secured a large financial support for his projects, the endowment growing from a few hundred thousand to a million dollars.

Instead of venturing into the realm of speculative and picturesque astronomy, he was content to be what he called himself "a collector of astronomical facts," the interpretation of which he was perfectly willing to leave to the future. The posthumous value of the work of such men as Herschel and Argelander appealed especially to him and shaped the large investigations that he undertook, whose importance could not be completely revealed perhaps for centuries.

Immediately upon his appointment to his new position, Professor Pickering chose as his particular field of labor the photometry of the stars. Soon after the introduction of the dry plate, in general photography, he was led to investigate its applicability to the study of the stars and their spectra in which work he was a pioneer. He also realized the great value of the objective prism in stellar spectroscopy and made constant use of it in his studies of stellar spectra.

The Observatory under Professor Pickering has made its largest contribution to astronomy in four fields.

(1) Photometry. With the aid of the meridian photometer invented by him, he devised a scale of photometric magnitudes, determining these for eighty thousand stars upon a basis of more than two million observations.

(2) A scale of photographic magnitudes. It was shown later that these are convertible into visual magnitudes through reference to the spectral types of the stars.

(3) A system of classification of variable stars. Light curves have been determined for a large number of these and many thousand measures of their brightness have been made on a uniform scale for all of the sky.

(4) A system of classification of stellar spectra which has been universally adopted. The new Henry Draper Catalogue contains estimates based on this system of all stars to approximately the ninth magnitude, about 200,000 in number.

Through the establishment of an observatory at Arequipa in 1891 after two years of preliminary study it became possible to include measurements made on the stars throughout the southern heavens within the scope of the work of the Harvard College Observatory.

At a later date, 1911, an observing station was established at Mandeville, Jamaica, which has been devoted particularly to the study of the moon and the planets.

In this short article it is not possible to go into detail or even to mention the great variety of investigations carried on to a successful completion. The volumes of the Harvard Annals, more than eighty of which were published during Professor Pickering's directorship, can alone give any idea of this.

A word, however, should be said of the "photographic library" which now contains over a quarter of a million photographic plates that together weigh one hundred and twenty tons. Through the use of short focus lenses and automatic following apparatus there has been kept a "sky patrol" the results of which furnish the history of all the stars down to the tenth magnitude and measuring back for many years. By its use whenever any noteworthy stellar change is discovered the plates will reveal its past history and character, while otherwise one might have to wait years to understand the nature of the phenomena.

Through the use of this library, it is possible to find the history of the stars, as one turns back the pages of a book already printed. What may still be hoped for from this crystallized past of the heavens is shown by what it has already done in recording the extraordinarily favorable position for observation of the minor planet Eros at its opposition in 1893, though it was not actually known even to exist until several years later in 1898.

Professor Pickering strongly believed in associative work. To him is due the organization of the American Astronomical Society in 1898 (originally called the Astronomical and Astrophysical Society) which now has a membership of over three hundred from all parts of the country, and has been of great service in stimulating research and promoting acquaintance among astronomers. The American Association of Variable Star Observers, a body composed chiefly of amateur observers of these objects, also originated with him.

Professor Pickering was elected a Fellow of the Academy in 1867 at the age of twenty-one years and is said to have been the youngest member ever chosen. He was averse to holding office, probably because during many years regularity of attendance at the meetings of the Academy would have interfered with his professional duties. He was a member of the Council from 1878 to 1884 and a member of the Committee on the Library from 1877 to 1883. He rendered great service to the Academy and to scientific research through his unprecedentedly long and devoted work as a Member of the Rumford Committee. This began in 1869 and continued up to the time of his death with a break, however, from 1890 to 1892, during which interval he was awarded the Rumford Premium "for his work on the photometry of the stars and upon stellar spectra." He contributed to the Proceedings twenty-six papers, three of them in collaboration with others. There will shortly be published by the Academy a memoir containing the results of researches upon the photometry of faint stars, carried on at various observatories with the use of a form of photometer devised by him for this especial service.

In 1874, Professor Pickering married Miss Lizzie Wadsworth Sparks, a daughter of the Reverend Jared Sparks, the historian, and a former President of Harvard University. Mrs. Pickering died in 1906.

To those who had the privilege of a personal acquaintance with Professor Pickering his great mind will always seem secondary to his greater heart, his generous friendship and his social charms.

He was never a narrow specialist interested only in his own branch of science. All astronomy, indeed all science, received his interest and encouragement. His broad sympathy included such dissimilar interests as mountain-climbing and music. He was the founder of the Appalachian Mountain Club and its first President. Music was an inspiration to him in his work, not as a relaxation alone, but as a stimulant which helped him to solve mathematical and physical problems.

He had the cooperative mind and the highest unselfishness actuated all his relations with his fellow astronomers. He subordinated his own individuality in his work and even the interests of his observatory to the good of astronomical science. All the honors of the astronomical world were showered upon him and upon the institution which under his direction had led the queen of sciences into new triumphs in untrodden fields.

As it was said of Sir Christopher Wren that his monument was Saint Paul's Cathedral, so the monument of Professor Pickering is found in the ninety volumes of the Annals of Harvard College Observatory, a monument which as long as man looks up at the heavens and wonders and interprets, should be an honorable and enduring one.

JOEL H. METCALF.

JOHN ELLIOTT PILLSBURY (1846–1919).

Fellow in Class II, Section 1, 1893.

This distinguished naval officer and oceanographer was born at Lowell, Massachusetts, December 15, 1846, the son of John Gilman and Elizabeth Wimble (Smith) Pillsbury. His early education was received in the public schools, and at the age of fourteen he was appointed a page in the House of Representatives.

In 1862 he received from President Lincoln a nomination to the U. S. Naval Academy, from which he graduated in 1867, being commissioned ensign in 1868 and lieutenant in 1872.

He married Florence Greenwood Aitchison of Portland, Maine, August 26, 1873. Elsie Greenwood, later wife of Edward B. Richardson of Brookline, Mass., was the only issue of this marriage.

In 1875 he was ordered to the Hydrographic Office of the Navy Department and the following year detailed to the U. S. Coast Survey, where he gave ten years of service and placed his name permanently on the roll of those who have materially added to our knowledge of the secrets of the Ocean.